

## ABSTRACT OF THE DISCLOSURE

An illumination device according to the present invention comprises a light source (1), an optical fiber bundle (4), a coupling-in optical system (3) before and a coupling-out optical system (5) after the fiber bundle (4),  
5 and an illuminating optical system (17; 20). A homogenizing optical system (6) between the coupling-out optical system (5) and illuminating optical system (17; 20) brings about a homogenization of the intensity distribution in the image field. The homogenizing optical system (6) advantageously comprises a micro-honeycomb condenser (7) and a lens member (8) which superimpose the exit  
10 opening of the fiber bundle (4) in an intermediate image plane (10) to form a homogeneous intermediate image. The coordinate measuring instrument comprises an X-Y measurement stage (26) for receiving a substrate with a feature (31) that is to be measured, an illumination system with a light source (1), an optical fiber bundle (4), a coupling-in optical system (3), a coupling-out optical  
15 system (5), an illuminating optical system (17; 20) for illuminating an image field on the substrate, and a detector device (14) for determining the position of the feature. A homogenizing optical system (6) between the coupling-out optical system (5) and illuminating optical system (17; 20) brings about a homogenization of the intensity distribution in the image field.

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(FIG. 1)